

Service Manual

NATIONAL
RADIO
PANASONIC

FM-AM 4-BAND PORTABLE RADIO MODEL RF-923LB



SPECIFICATIONS

Frequency:	FM 87.5~108 MHz LW 150~250 kHz (2000~1200m) MW 520~1610 kHz (577~186m) SW 5.9~10 MHz (50.8~30.0m)
Intermediate Frequency:	FM 10.7 MHz AM (LW, MW & SW) 455 kHz
Sensitivity:	FM 2 μ V for 50mW Output LW 100 μ V/m for 50mW Output MW 50 μ V/m for 50mW Output SW 5 μ V for 50mW Output
Power Output:	1.8W Maximum
Power Source:	AC 110~125V/220~240V 50-60 Hz or 6V (Four "C" Size Flashlight Batteries)(NATIONAL UM-2 or equivalent)
Power Consumption:	4W (AC Only)
Speaker:	16 cm (6 $\frac{1}{2}$ ") PM Dynamic Speaker
Dimensions:	269(Wide)×183(High)×87(Deep)mm (10 $\frac{1}{32}$ "×7 $\frac{3}{16}$ "×3 $\frac{3}{16}$ ")
Weight:	2.0 kg (4 lb. 6.5 oz.) without batteries
Impedance:	Speaker8 Ω Earphone Jack8 Ω DIN Jack90k Ω (Phono)

TO REMOVE CHASSIS

1. Remove four (4) control knobs from cabinet.
 2. Remove the battery cover.
 3. Remove whip antenna from antenna bracket, as illustrated in fig. 1.
 4. Remove three (3) cabinet cover screws, nos. 1~3, as illustrated in fig. 1.
 5. Remove cabinet cover in direction of arrow, as illustrated in fig. 2.
 6. Remove two lead connector sockets to earphone jack.
 7. Remove four (4) red chassis screws, nos. 1~4, as illustrated in fig. 3.
 8. To remove chassis completely, unsolder lead wires to lead terminal and remove switch holder (AC/BATT, LOUDNESS, PHONO/RADIO), as illustrated in fig. 3.
 9. To reassemble, reverse the above procedure.
- * When open the cabinet cover, always remove four (4) control knobs.

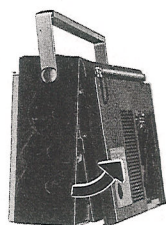


Fig. 2

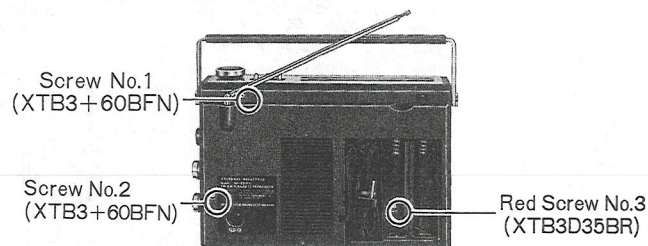


Fig. 1

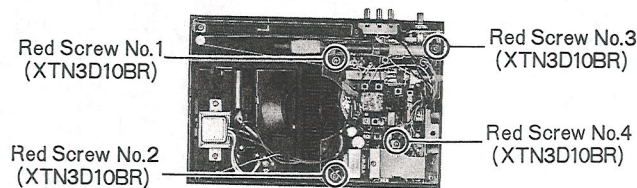
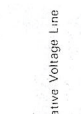
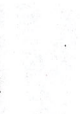
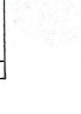
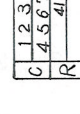
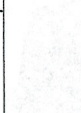
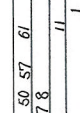
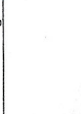
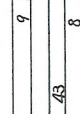
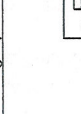
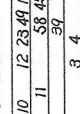
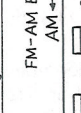
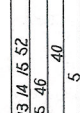
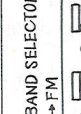
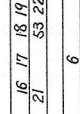
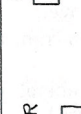
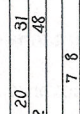
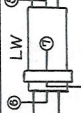
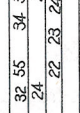
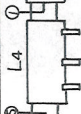
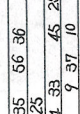
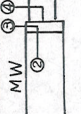
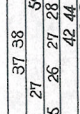
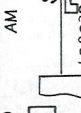
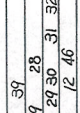
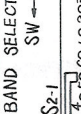
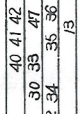
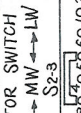
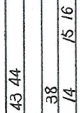
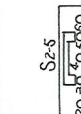
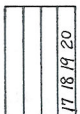
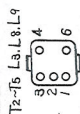
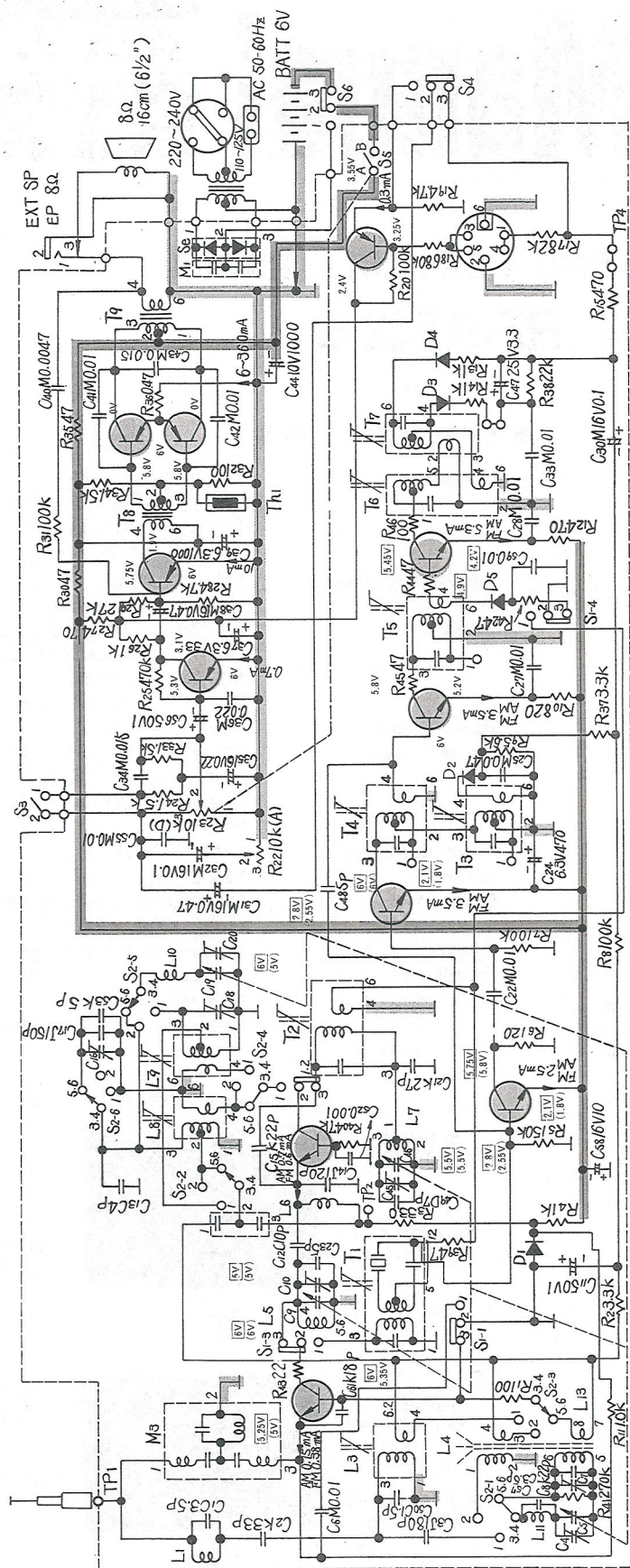


Fig. 3

MATSUSHITA ELECTRIC
MATSUSHITA ELECTRIC TRADING CO., LTD.
P. O. Box 288, Central Osaka, Japan



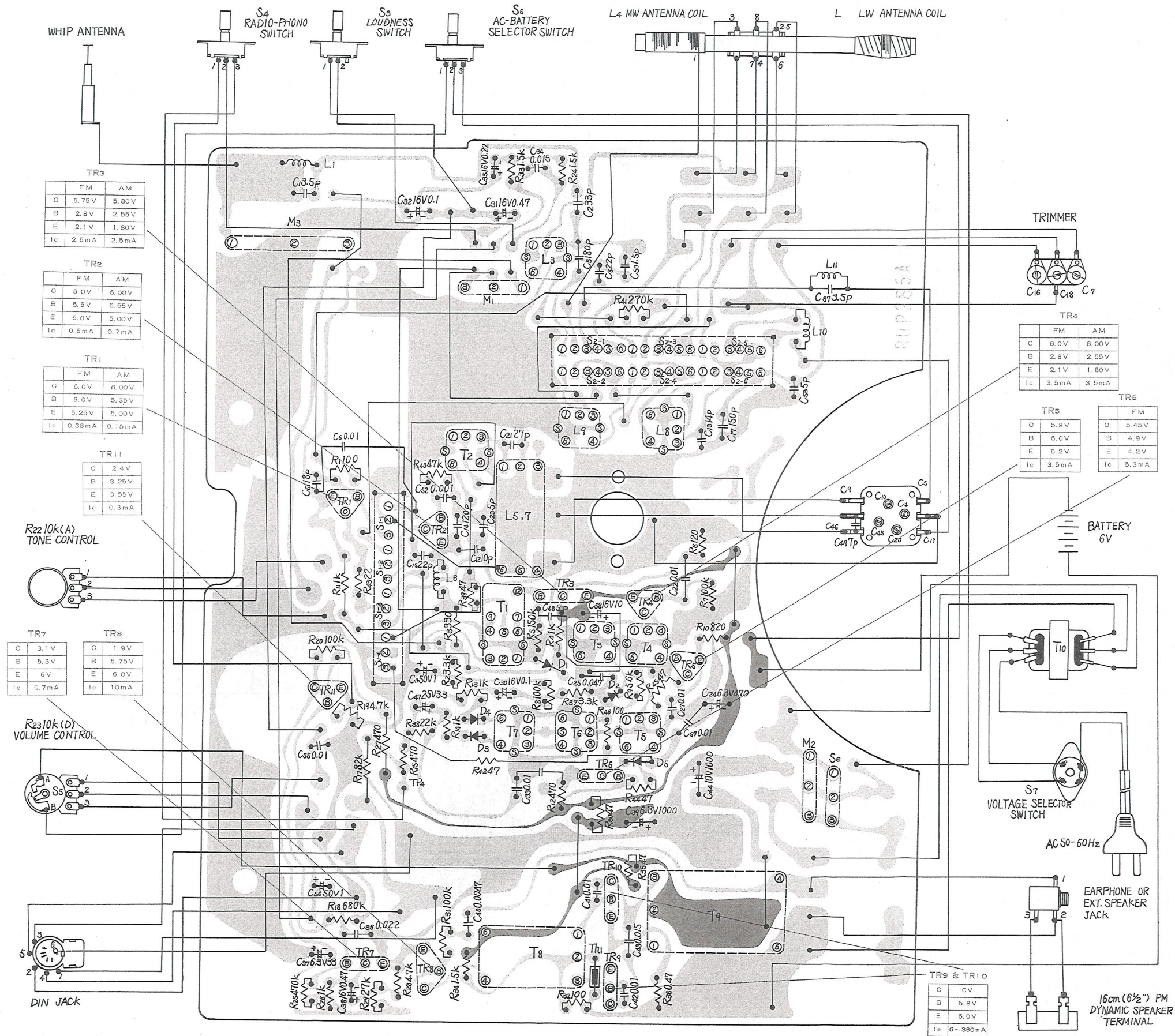
Schematic Diagram - Model RF-923LB



Notes:

1. S1-1~S1-4: FM-AM band selector switch in "FM" position.
2. S2-1~S2-6: AM band selector switch in "LW" position.
3. S3: Loudness switch in "OFF" position.
4. S4: Radio/Phono selector switch in "RADIO" position.
5. S5: Power source switch in "OFF" position.
6. S6: AC/Battery selector switch in "BATT" position.

Circuit Board Wiring View-Model RF-923LB



DIAL CORD INSTALLATION GUIDE

1. Dial cord length is 110 cm (43 3/16").
2. Turn dial drum to right fully.
3. Arrows (1~8) indicate correct order and direction of installation dial cord. (Fig. 4)
4. Cement dial cord end.
5. Turn drum bracket to left fully.
6. Insert the drum to drum bracket as illustrated in fig. 5.

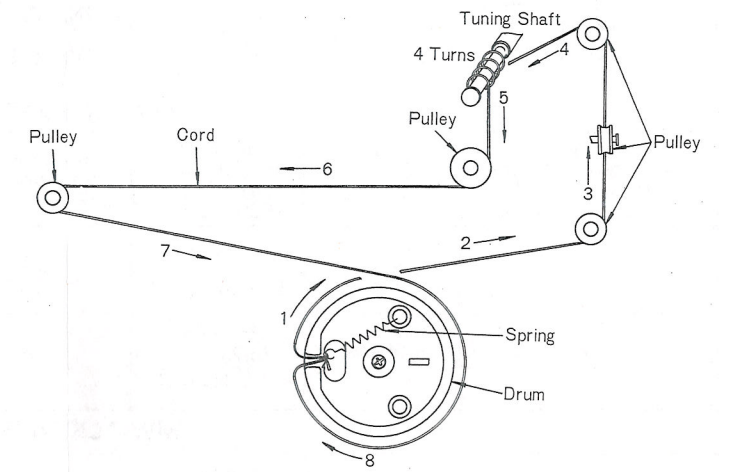


Fig. 4

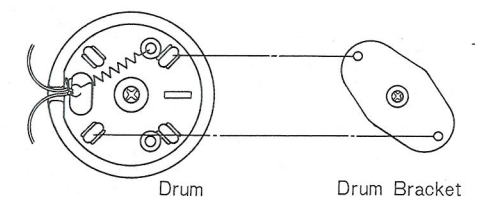


Fig. 5

TO MOUNT DIAL POINTER

1. Remove the dial scale.
2. Set the tuning gang at maximum capacity.
3. Attach the dial pointer to pointer guide.
4. Attach dial cord to dial pointer.
5. Reassemble the dial scale.
6. Set the dial pointer to start point of dial scale.

■ ALIGNMENT INSTRUCTIONS

READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT					
Notes: 1. Set volume control to maximum or minimum (FM-IF).. 2. Set tone control to HIGH. . 3. Set band selector switch to LW, MW, SW or FM. 4. Set PHONO-RADIO selector switch to RADIO. 5. Set loudness switch to OFF. 6. Set AC-Battery selector switch to BATT. 7. Set power source voltage to 6 volts DC. 8. Output of signal generator should be no higher than necessary to obtain an output reading.					
SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING (DISTANCE)	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
CONNECTIONS	FREQUENCY				
LW ALIGNMENT					
1	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz 30% Mod. with 400Hz.	Point of non-interference. (on/about 600 kHz)	Output meter across voice coil.	T ₁ (1st IFT) T ₃ (3rd IFT) Adjust for maximum output.
2	"	150 kHz	150 kHz [5.3mm ($\frac{3}{16}$ ")]	"	(*)L ₁₃ (ANT Coil) Adjust for maximum output. Adjust L ₁₃ by moving coil bobbin along ferrite core.
3	"	250 kHz	250 kHz [76.2mm ($3\frac{1}{16}$ ")]	"	C ₁₆ (OSC Trimmer) C ₇ (ANT Trimmer) Adjust for maximum output. Repeat steps (2) and (3).
MW ALIGNMENT					
4	"	550 kHz	550 kHz [9.2mm ($2\frac{3}{64}$ ")]	"	L ₈ (OSC Coil) (*)L ₄ (ANT Coil) Adjust for maximum output. Adjust L ₄ by moving coil bobbin along ferrite core.
5	"	1500 kHz	1500 kHz [83.9mm ($3\frac{3}{8}$ ")]	"	C ₂₀ (OSC Trimmer) C ₄ (ANT Trimmer) Adjust for maximum output. Repeat steps (4) and (5).
* Cement antenna bobbin with wax after completing alignment.					
SW ALIGNMENT					
6	Connect point TP ₁ through 10PF capacitor. Common to chassis.	6 MHz	6 MHz [9.4mm ($\frac{3}{8}$ ")]	"	L ₉ (OSC Coil) L ₃ (ANT Coil) Adjust for maximum output.
7	"	10 MHz	10 MHz [84.6mm ($3\frac{1}{2}$ ")]	"	C ₁₈ (OSC Trimmer) Adjust for maximum output. Repeat steps (6) and (7).
FM-IF ALIGNMENT					
8	High side thru. 0.001μF to point TP ₂ . Common to chassis.	10.7 MHz (400 kHz SWP.)	Point of non-interference. (on/about 93 MHz)	Connect vert. amp. of scope to point TP ₃ . (*) Common to chassis.	T ₂ (FM 1st IFT) T ₄ (FM 2nd IFT) T ₅ (FM 3rd IFT) T ₆ (FM DET IFT) (Primary) Adjust for maximum amplitude and proper linearity between ±100kHz markers. (Refer to fig. 1)
9	"	"	"	Connect vert. amp. of scope to point TP ₄ . Common to chassis.	T ₇ (FM DET IFT) (Secondary) Adjust T ₇ so that 10.7 MHz marker appears at the center. (Refer to fig. 2)
* Unsolder lead between test point TP ₃ and point A before alignment and resolder it after alignment.					
FM-RF ALIGNMENT					
10	Connect to point TP ₁ through FM Dummy antenna. Common to chassis. (Refer to fig. 3)	87.2 MHz	Minimum frequency	Output meter across voice coil.	L ₅ (FM OSC Coil) (*)Adjust for maximum output.
11	"	90 MHz	Tune to signal	"	L ₇ (FM ANT Coil) "
12	"	106 MHz	106 MHz [76.0mm (3")]	"	C ₄₅ (FM OSC Trimmer) C ₁₀ (FM ANT Trimmer) (*)Adjust for maximum output. Repeat steps (10) and (12).
* Three output responses will be present; proper tuning is the center frequency.					

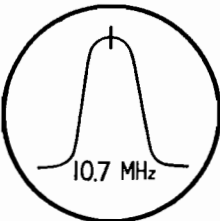
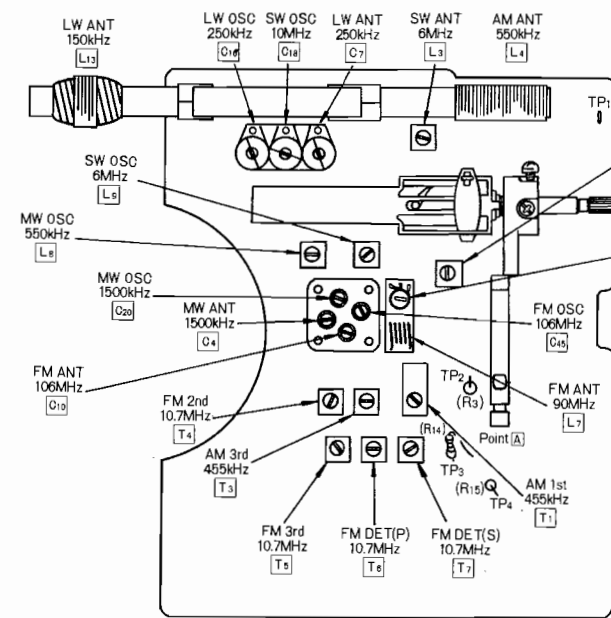


Fig. 1

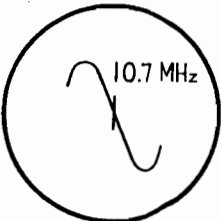


Fig. 2

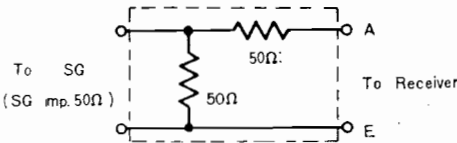
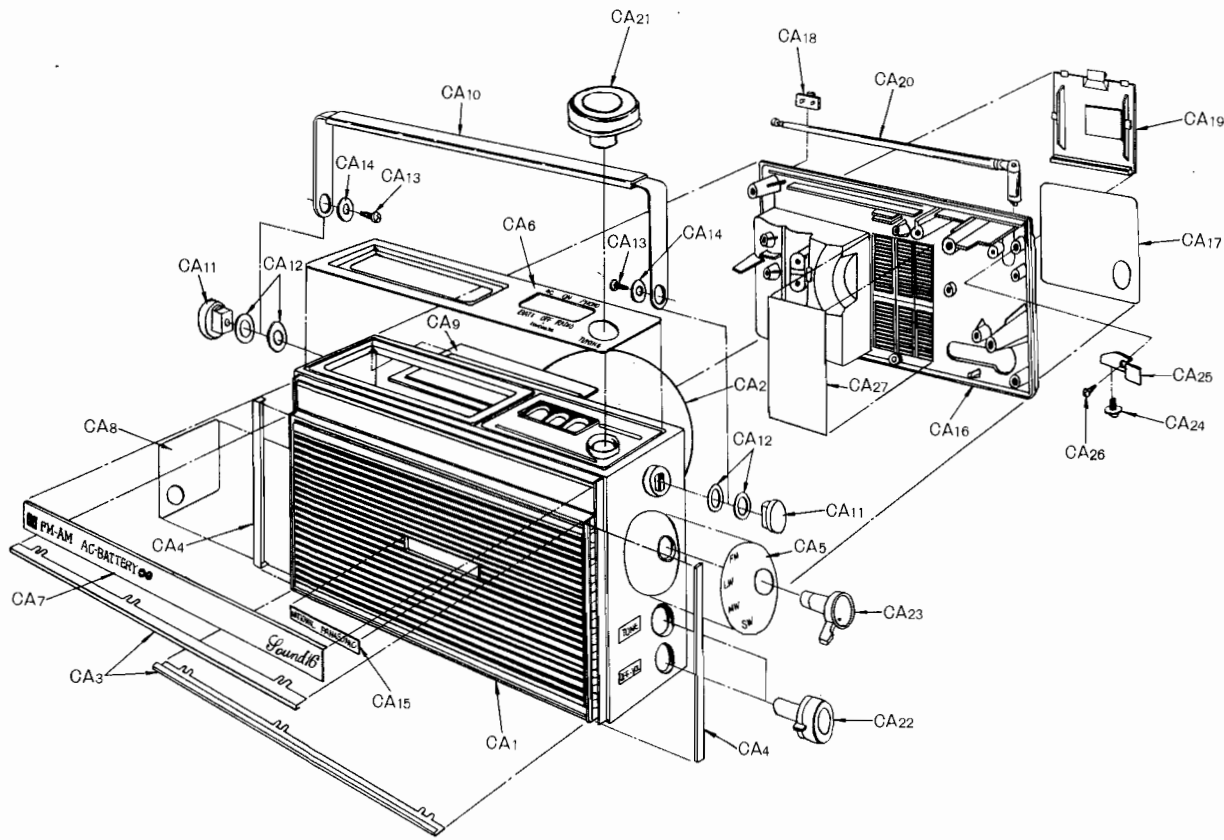
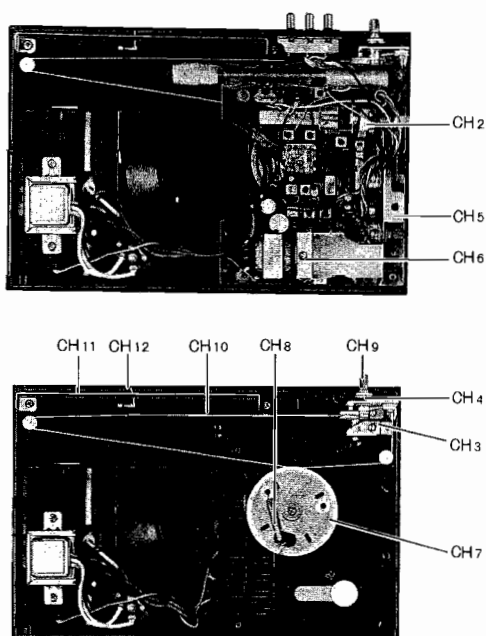


Fig. 3

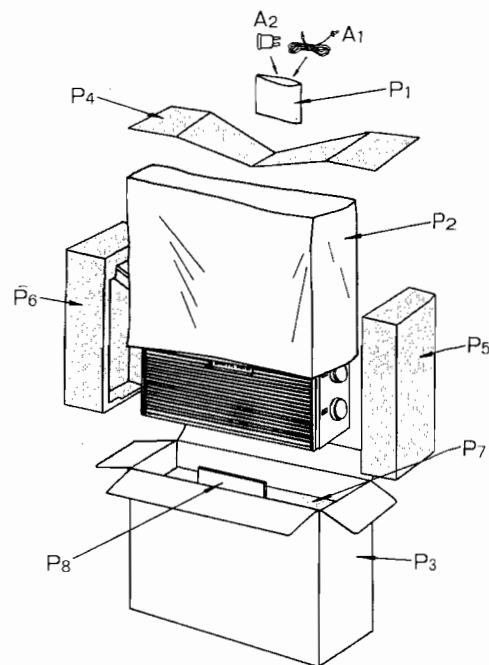
■ CABINET PARTS LOCATIONS



■ CHASSIS PARTS LOCATIONS



■ PACKING PARTS LOCATIONS



■ REPLACEMENT PARTS LIST

- NOTES:**
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 2. S indicates the New Parts.
 3. X Z rank: X rank parts will cover 80% of repair needs. X+Y rank parts will cover 95% of repair needs. Z rank parts are less necessary.

Ref.No.	Part No.	Description	Per Set (Pcs.)	Remarks
TRANSISTORS AND DIODES				
TR1	2SC921	FM RF Amplifier & AM Mixer	1	X
TR2	2SC1359	FM Converter & AM L. OSC	1	X
TR3,5	2SC829	FM & AM IF Amplifier, FM IF Amplifier	2	X
TR6	2SC829	FM IF Amplifier	1	X
TR4	2SC920	FM & AM IF Amplifier	1	X
TR7	2SA564	AF Amplifier	1	X
TR11	2SB173	Phono Amplifier	1	X
TR8	2SB175	AF Amplifier	1	X
TR9,10	2SB324	Power Amplifier	2	X
D1	RVDKB265J2	Stabilizer	1	X
D2	0A90	AM Detector & AGC	1	X
D3,4	2-0A90	FM Detector	2	X
D5	RVDKB265J3	AOC	1	X
THERMISTOR AND RECTIFIER				
Th1	RRT800	Temperature Compensator	1	X
Se	RVD10DC1R	Rectifier	1	X
COILS AND TRANSFORMERS				
L1,10,11	RLQY75S5-0	Choke Coil	3	Y
L3	RLA3B16-M	SW Antenna Coil	1	X
L4,13	RLF6F12	MW, LW Antenna Coil	1	X
L5,7	RLF52	FM Coil, Oscillator Coil	1	X
L8	RL02B90-M	MW, LW Oscillator Coil	1	X
L9	RL03B67-M	SW Oscillator Coil	1	X
L6	RLQY25S5-0	Choke Coil	1	Y
T1	RLI7W105-T	AM 1st IF Transformer	1	X
T3	RLI2B450-M	AM 3rd IF Transformer	1	X
T2	RLI4B152	FM 1st IF Transformer	1	X
T4,5	RLI4B351	FM 2nd & 3rd IF Transformer	2	X
T6	RLI4B510	FM Detector IF Transformer (P)	1	X
T7	RLI4B552	FM Detector IF Transformer (S)	1	X
T8	RLT3F33-W	Input Transformer, P=1.4KΩ: S=1.4KΩ	1	X
T9	RLT2H23-W	Output Transformer, P=55Ω: S=8Ω	1	X
T10	RLT5I32-W	Power Transformer	1	X

Ref.No.	Part No.	Description	Per Set (Pcs.)	Remarks
RESISTORS				
R36	ERM12VKR47	0.47Ω, 1/2Watt, Solid	1	Y
R30,35,39	ERD14VJ470	47Ω, 1/4Watt, Carbon	5	Y
44,45				
R1,32,46	ERD14VJ101	100Ω, 1/4Watt, Carbon	3	Y
R11	ERD18TJ102	1KΩ, 1/2Watt, Carbon	1	Y
R34	ERD14VJ152	1.5KΩ, 1/4Watt, Carbon	1	Y
R6	ERD14VJ121	120Ω, 1/4Watt, Carbon	1	Y
R15	ERD14TJ471	470Ω, 1/4Watt, Carbon	1	Y
R12	ERD14VJ471	470Ω, 1/4Watt, Carbon	1	Y
R10	ERD14VJ821	820Ω, 1/4Watt, Carbon	1	Y
R4,13,26	ERD14VJ102	1KΩ, 1/4Watt, Carbon	3	Y
R24,33	ERD18VJ152	1.5KΩ, 1/2Watt, Carbon	2	Y
R2,37	ERD14VJ332	3.3KΩ, 1/4Watt, Carbon	2	Y
R19,28	ERD14VJ472	4.7KΩ, 1/4Watt, Carbon	2	Y
R9	ERD14VJ562	5.6KΩ, 1/4Watt, Carbon	1	Y
R38	ERD14VJ223	22KΩ, 1/4Watt, Carbon	1	Y
R29	ERD14VJ273	27KΩ, 1/4Watt, Carbon	1	Y
R40	ERD14VJ473	47KΩ, 1/4Watt, Carbon	1	Y
R7,8,20,31	ERD14VJ104	100KΩ, 1/4Watt, Carbon	4	Y
R5	ERD14VJ154	150KΩ, 1/4Watt, Carbon	1	Y
R41	ERD14VJ274	270KΩ, 1/4Watt, Carbon	1	Y
R18	ERD14VJ684	680KΩ, 1/4Watt, Carbon	1	Y
R25	ERD14VJ474	470KΩ, 1/4Watt, Carbon	1	Y
R3	ERD14VJ331	330Ω, 1/4Watt, Carbon	1	Y
R43	ERD18TJ220	220Ω, 1/2Watt, Carbon	1	Y
R27	ERD18TJ471	470Ω, 1/2Watt, Carbon	1	Y
R16	ERD18TJ104	100KΩ, 1/2Watt, Carbon	1	Y
R17	ERD18TJ823	82KΩ, 1/2Watt, Carbon	1	Y
R42	ERD14TJ470	47Ω, 1/4Watt, Carbon	1	Y
R14	ERD14TJ102	1KΩ, 1/4Watt, Carbon	1	Y
VARIABLE RESISTORS				
R22	EVHQ0AL15A14	10KΩ (A), Tone Control	1	X
R23	EVHQ0BL15D14	10KΩ (D), Volume Control	1	X
CAPACITORS				
C50	ECCD051R5C	1.5 pF, 50WV, Ceramic	1	Z
C1,57	ECCD053R5C	3.5 pF, 50WV, Ceramic	2	Z
C13	ECCD05040C	4 pF, 50WV, Ceramic	1	Z
C23,53,48	ECCD05050CC	5 pF, 50WV, Ceramic	3	Z
C49	ECCD05070DC	7 pF, 50WV, Ceramic	1	Z
C12	ECMS05100K-H	10 pF, 50WV, Mica	1	Z
C61	ECMS05180K-H	18 pF, 50WV, Mica	1	Z
C15,8	ECMS05220K-H	22 pF, 50WV, Mica	2	Z
C21	ECMS05270K-H	27 pF, 50WV, Mica	1	Z
C2	ECMS05330K-H	33 pF, 50WV, Mica	1	Z
C14	ECMS05121J-H	120 pF, 50WV, Mica	1	Z

Ref.No.	Part No.	Description	Per Set (Pcs.)	Remarks	Ref.No.	Part No.	Description	Per Set (Pcs.)	Remarks
C17	ECMS05151J-H	150 pF, 50WV, Mica	1	Z	CHASSIS				
C3	ECMS05181J-H	180 pF, 50WV, Mica	1	Z		RJA5A	AC Cord, Power Source	1	Y
C52	ECKD05102P	0.001 μF, 50WV, Ceramic	1	Z		RJJ10C	Jack, Earphone/External Speaker	1	Y
C59	ECKE05103P	0.01 μF, 50WV, Ceramic	1	Z		RJS17A	Socket, Earphone/External Speaker Jack Connector	2	Y
C6,22,28	ECKE05103MY	0.01 μF, 50WV, Ceramic	3	Z	CH1	RJS25B	Jack, Recording & Playback	1	Y
C40	ECQG05472MZ-N	0.0047 μF, 50WV, Polyester	1	Z		RJC203A	Terminal, Battery ⊕ Side	2	Y
C27,33,41,42,55	ECQG05103MZ-N	0.01 μF, 50WV, Polyester	5	Z		RJC601	Spring, Battery ⊖ Side	2	Y
C34,43	ECQG05153MZ-N	0.015 μF, 50WV, Polyester	2	Z	CH2	RUB60AS	Bracket, Band Selector	1	Y
C25	ECQG05473MZ-N	0.047 μF, 50WV, Polyester	1	Z	CH3	RUC45A	Bracket, Whip Antenna	1	Z
C30,32	ECAG16ER1-Y	0.1 μF, 16WV, Electrolytic	2	Y	CH4	RUL192A	Bracket, Tuning Shaft	1	Z
C36	ECAG16ER22-Y	0.22 μF, 16WV, Electrolytic	1	Y	CH5	RUL193A	Chassis	1	Z
C31,35,38	ECAG16ER47-Y	0.47 μF, 16WV, Electrolytic	3	Y	CH6	RMV44-2	Heat Sink	1	Z
C11,56	ECEA50V1	1 μF, 50WV, Electrolytic	2	Y	CH7	RDD603A	Drum, Dial	1	Y
C58	ECEA16V10	10 μF, 16WV, Electrolytic	1	Y	CH8	RDS4170A	Spring, Dial	1	Y
C37	ECEA6V33	33 μF, 6.3WV, Electrolytic	1	Y	CH9	ROD2201A	Shaft, Tuning	1	Y
C24	ECEA6V470	470 μF, 6.3WV, Electrolytic	1	Y	CH10	ROD205A	Cord, Dial 110cm (43 3/8")	1	Y
C39	ECEA6V1000	1000 μF, 6.3WV, Electrolytic	1	Y	CH11	RKD202A	Scale, Dial	1	Z
C44	ECEA10V1000	1000 μF, 10WV, Electrolytic	1	Y	CH12	RDP87A	Pointer, Dial	1	Z
C47	ECEA25V3R3	3.3 μF, 25WV, Electrolytic	1	Y		RDE44A	Bracket, Dial Drum	1	Y
VARIABLE CAPACITORS						XSN3D6S	Screw, Band Selector Bracket M'tg	2	Z
C5,9,19,46	PVC2LX20T3NG	Tuning Gang, W/Trimmer (C4,10,20,45)	1	X		XTN3D10BR	Red Screw, Chassis M'tg	4	Z
C7,16,18	RCV3T-16M	Trimmer, FM Oscillator	1	X	ACCESSORIES				
COMPONENT COMBNATION					A1	EAE1FB	Magnetic Earphone, Imp. 8 Ω	1	Y
M1	RXAR103M-2A	0.01 μF × 2	1	Y	A2	RJP17AS	Plug, Power Source	1	Y
M2	RXAF103P22HD	0.01 μF × 2	1	Y	PACKING				
M3	RXABPF10801C	Capacitors & Coils Component Combination	1	Y	P1	RPF25	Polyethylene Cover	1	Z
SWITCHES					P2	RPP78A	Polyethylene Cover	1	Z
S1-1 ~ S1-4	RSH45A	FM-AM Band Selector Switch	1	X	P3	RP6816A	Carion Box	1	Z
S2-1 ~ S2-6	RSR48A	AM Band Selector Switch	1	X	P4	RPN1165A	Pad A	1	Z
S3,4,6	RSS80A	Loudness, Radio/Phono, AC/Battery Switch	3	X	P5	RPN1141A-1	Pad B	1	Z
S7	RSR12A	Voltage Selector Switch	1	X	P6	RPN1142A-2	Pad C	1	Z
SPEAKER					P7	RPN1140A	Pad D	1	Z
SP	EAS16P86S	16cm (6 1/4") PM Dynamic Speaker, Imp. 8 Ω	1	X	P8	RPE137A	Pad, Handle	2	Z
						RQX5437A	Instruction Book	1	Y

CABINET

Ref.No.	Part No.	Description	Per Set (Pcs.)	Remarks
CA1	RKM194A	Cabinet Only	1	Z
CA2	RKB56B	Baffle, Speaker	1	Z
CA3	RGX388A	Ornament, Cabinet Upper and Lower Sides	2	Z
CA4	RGX389A	Ornament, Cabinet Both Side	2	Z
CA5	RGK307A	Indicating Plate, FM, LW, MW, SW Mark	1	Z
CA6	RGX415A	Indicating Plate, TUNING, LOUDNESS Mark	1	Z
CA7	RGK309A	Indicating Plate, Sound 16 Mark	1	Z
CA8	RGK310A	Indicating Plate, Earphone and External Speaker Mark	1	Z
CA9	RGP177A	Cabinet Front (Complete)	1	Y
CA10	RKH46A	Panel, Dial	1	Y
CA11	RKT46A	Handle, Cabinet	1	Y
CA12	RNW1020	Metal Fitting, Handle-M'tg	2	Y
C12	RNW1020A	Washer, Handle M'tg	2	Z
CA13	XTN3D10B	Washer, Handle M'tg	2	Z
CA14	XWG3F13	Screw, Handle M'tg	2	Z
CA15	RGB32B	Washer, Handle M'tg	2	Z
CA16	RKF131BS	Badge, NATIONAL PANASONIC Mark	1	Z
CA17	RG283A	Cabinet (Complete)	1	X
CA18	RMA5014A	Cabinet Back Only	1	Z
CA19	RKK59A	Name Plate	1	Y
CA20	XEAROR196ECS	Cabinet Back (Complete)	1	Y
CA21	RBN40D	Bracket, Whip Antenna M'tg (Plastic)	1	Y
CA22	RBN175A	Cover, Battery Compartment	1	X
CA23	RBS24B	Whip Antenna	1	X
CA24	XTB3+60BFN	Knob, Tuning	1	X
CA25	XTB3D35BR	Knob, Volume & Tone Control	2	X
CA26	XYN3DF6S	Knob, Band Selector	1	X
CA27	RUC45A	Screw, Cabinet Cover M'tg	2	Z
	XTN3D8B	Red Screw, Cabinet Cover M'tg	1	Z
	RHS346A	Screw, Whip Antenna M'tg	1	Z
		Bracket, Whip Antenna	1	Z
		Screw, Whip Antenna M'tg	1	Z
		Baffle, Back Cover	1	Z